Q. Please update the status of Hydro's actions on each recommendation in the December 17, 2014 report Executive Summary prepared by the Liberty Consulting Group with regard to Hydro's Isolated Island System (IIS).

A. Liberty's Executive Summary provides an overview of the recommendations specifically listed in Appendix A: Conclusions and Recommendations Summary. In Appendix A the recommendations are grouped under nine headings, and Hydro's response utilizes the same headings for clarity.

Planning and Supply

2.1. Provide the Board with monthly updates on the status of Nostradamus upgrades until the production model is fully in-service and shaken down. (Conclusion No. 2.1 and 2.2)

This item has been implemented and Hydro continues to send the requested updates to the Board on a monthly basis.

2.2. By April 30, 2015, provide the Board an assessment of the effectiveness of Nostradamus during the 2014-15 winter and the sufficiency of the model for continued future use. (Conclusion No. 2.1 and 2.2)

This item is complete and a report entitled *Accuracy of Nostradamus Load Forecasting at Newfoundland and Labrador Hydro Winter 2014/2015* was filed with the Board on April 30, 2015.

2.3. Provide the Board with the guide on system losses under various configurations and any instructions for their use. (Conclusion No. 2.3)

This item is complete. In accordance with Hydro's response to PUB-NLH-457 from the Investigation and Hearing into Supply Issues and Power Outages on the Island Interconnected System, an analysis was completed to assess the impact of transmission line contingencies and alternate generation dispatches on system losses. The results of this analysis were submitted to the Board on December 17, 2014.

2.4. Continue to include the P90 load forecast prominently in all evaluations of power supply adequacy. (Conclusion No. 2.5)

Hydro has adopted the use of a 90^{th} percentile (P90) peak demand load forecast as part of Hydro's system planning for the Island Interconnected system. A P90 demand forecast is prepared annually in conjunction with Hydro's winter readiness preparation and with Hydro's long term planning analyses.

2.5. By March 1, 2015, provide data relating the actual values of the weather variable on the 2013-14 winter days on which the annual peak forecast was exceeded. (Conclusion No. 2.5)

This is complete, and the data was provided to the Board as requested. It was addressed in Hydro's March 2, 2015 report to the Board entitled *A Report to the Board of Commissioners of Public Utilities Regarding Peak Forecast Exceedances in the 2013/14 Winter Period*.

2.6. By March 1, 2015: (1) clarify Hydro's proposed reconstruction of the winter 2013-14 peak, (2) provide a specific value for the reconstructed peak, and (3) report on the impact of the reconstructed peak on the analysis of 2013-14 forecast exceedances. (Conclusion Nos. 2.6 and 2.7)

This item is complete. It was addressed in Hydro's March 2, 2015 report to the Board entitled *A Report to the Board of Commissioners of Public Utilities Regarding Peak Forecast Exceedances in the 2013/14 Winter Period***.**

2.7. Validate a reasonable and practical criterion for reserve margins, although not necessarily in the form of a rigid number, and characterize the degree of risk associated with that criterion.

This item is complete. It was discussed in Section 3.1.1.2 Recommendations by Liberty Consulting Reserve Margin Criterion pages 11-16 of *Newfoundland and Labrador Hydro's Response to the Phase I Report by Liberty Consulting (Hydro's Reply)* filed February 5, 2015. On page 16, Hydro proposed:

> *As well, consistent with Liberty's recommendation 2.7, Hydro proposes that in August of each year it will file an update with the PUB providing:*
>
> *1. The updated P90 load forecast for the period up to one year beyond the then anticipated interconnection date.*
>
> *2. A summary of the previous winter's generation performance and an outlook of peak available generating capacity for each year of the load forecast.*
>
> *3. The forecast generation reserves both in percentage and total MW's.*

In the event there are changes that result in the forecast reserve falling below 240 MW, Hydro will complete an assessment of the associated risks and report to the Board its recommended mitigations.

The 240 MW available reserve margin has been used in a number of reports to the Board, including the *Report to the Board of Commissioners of Public Utilities on Generation Adequacy*, submitted September 2015 and the *Energy Supply Risk Assessment*, submitted May 2016.

Reserve criteria have been addressed in Hydro's Island and Avalon reserve criteria which are also integrated with system alert levels. There are well defined instructions on this and the reserves are assessed in real time and reported on each day by Hydro's System Operations group. Hydro continues to file *System Supply and Demand Status Reports* with the Board on a daily basis.

2.8. Report quarterly on the rolling 12-month performance of its units, including actual forced outage rates and their relation to: (a) past historical rates, and (b) the assumptions used in the LOLH calculations.

The report was first completed for 2015 Q1 and filed with the Board on May 14, 2015. This report continues to be provided to the Board on a quarterly basis.

2.9. Report promptly to the Board any potential change in the outlook for the adequacy of supply, including increases in forecasted peaks or reductions in unit availabilities.

This report is provided daily to the Board via the daily supply and demand reporting process.

2.10. Continue to treat completion of the new CT as soon as possible a high priority for Hydro management, supported by close executive attention. (Conclusion No. 2.12)

This was completed in 2015 with the unit available for service on March 1, 2015.

2.11. Establish and use a more effective system of reporting and analyzing status to give Hydro management early warning and the opportunity for intervention. (Conclusion No. 2.14)

This item was completed as planned. S-curve progress reporting for maintenance plans was implemented, including a subset for winter readiness. Also project reporting metrics were fully standardized and consistently applied.

2.12. In all reports to the Board, provide, and adhere to, a clear definition of reporting practices, including the definition of classifications (such as colors) used to categorize performance status. (Conclusion No. 2.14)

This item was completed as planned through consistent application of standard project reporting metrics. Hydro's COO and Manager Regulatory Engineering met with representatives of the Board in 2015 and the confirmed approach was acceptable.

2.13. Given the vulnerabilities likely to be present on December 1, 2014, Hydro must take at least the following actions immediately:

a) Prepare an emergency contingency plan to identify all generation resources for a potential supply emergency while the new CT remains unavailable.

This item has been addressed. All available generation sources and their status are documented daily in System Operations. Status of these sources is reviewed as part of pre-event planning in advance of severe weather.

b) Report to the Board all steps being taken to expedite completion of the new CT.

Completed as required and unit went into service March 1, 2016.

c) Be prepared to trigger emergency plans when and if extreme weather sufficient to reach or exceed expected peaks is forecast.

This item has been addressed. An email is sent from System Operations to responsible field operations staff when a weather alert is issued by Environment Canada based on criteria in the severe weather protocol. If the event has potential for a significant impact on system reliability, a coordinated preparation effort is completed which includes completion of regional severe weather checklists. System Operations then confirms readiness through a meeting to review readiness preparations and document the plan in an event slide deck which is then distributed for reference through the event.

d) Report to the Board daily whenever forecasted reserves for the day are less than 10 percent.

This reporting is in place and triggers through the daily supply and demand report.

e) Report to the Board immediately whenever forecast reserves fall under 10 percent during any day. (Conclusion No. 2.15 and 2.16)

This reporting is in place and triggers through the daily supply and demand report.

2.14. Continue to rely on the old CTs for reliable capacity and continue to focus on steps to improve their availability. (Conclusion No. 2.15 and 2.16)

Hydro has continued to rely on and improve the old CT's at Hardwoods and Stephenville. Hydro continues to execute maintenance, life extension and refurbishment plans to improve reliability for these standby units. The positive outcome of this effort is reflected in improvements in the UFOP - Utilization Forced Outage Probability metrics for these units, as well as the ability to produce in excess of forecasted demand when called upon to meet system and customer needs, particularly on the Avalon. The units have a better UFOP performance. For example in 2014 the UFOP for Hardwoods was 35.09%, 6.39% in 2015 and year to date 2016 is 0.44%. Similarly, Stephenville UFOP was 13.73% in 2014, 15.71% in 2015 and 0.54% in 2016. Also the Hardwoods GT has operated and produced more in 2014, 2015 and 2016 than double any time previous. The facility operated 354 hours in 2014, 410 in 2015, and 647 hours year to date 2016, versus the previous

peak of 206 in 1993. Hydro is reviewing the long term strategy for Hardwoods and Stephenville in light of the increased operation in recent winters and future requirements for these units to determine if any changes are warranted.

2.15. Report to the Board by February 15, 2015, the final status of the program for critical spares, its results versus expectations of the master plan, a listing of spares to be procured, and when they will be available. (Conclusion No. 2.18)

This report was filed with the Board on February 16, 2016 with the requested content.

2.16. Complete planned demand management analysis on a Hydro/Newfoundland Power jointly scoped, conducted, and developed basis and report to the Board a structured cost/benefit analysis of short term program alternatives by September 15, 2015. (Conclusion No. 2.21)

Hydro completed this item upon submission of the analysis to the Board on September 15, 2015. A 5-Year Plan was noted as in development at the time. The 5-Year Plan was subsequently completed and filed by Newfoundland Power with its 2016-2017 GRA on October 16, 2016, and was also filed by Hydro in March 2016 as an attachment to Hydro's 2015 Conservation and Demand Management Report.

Asset Management Programmatic Aspects

Hydro's Asset Management program was recognized as being sound and conforming with best practices. There were no recommendations specific to the program.

Transmission and Distribution System Planning and Design

4.1. Investigate and report on methods that can reduce Planned T-SAIDI. (Conclusion No. 4.1)

Hydro completed a review to determine if there were areas in the Island Interconnected System that would see a benefit from a capital investment in sectionalizing or mobile generation during planned outages. It was determined that the cost would exceed any benefits. In addition, work is underway to determine the steps required if Hydro were to return to live line work in a safe and deliberate manner.

4.2. Analyze and report on the benefits of a dedicated capital program component dedicated to addressing the previous year's 10 to 15 percent worst performing feeders. (Conclusion No. 4.6)

Hydro has analyzed the feeder performance data, identified gaps in the capital plan and modified the capital plan to close any gaps to ensure the worst performing feeders were addressed.

4.3. When prioritizing reliability projects, include a factor that relates cost to anticipated avoided customer interruption numbers and minutes. (Conclusion No. 4.7)

Hydro has reviewed its capital project prioritization calculator and updated it to include a factor that relates cost to anticipated avoided customer interruption numbers and minutes.

4.4. Increase the weighting given to resulting SAIFI, SAIDI, and numbers of customer interruptions and minutes when prioritizing proposed project. (Conclusion No. 4.8)

Hydro has reviewed its capital project prioritization calculator and increased the weighting given to factors SAIDI, SAIFI and numbers of interruptions and minutes.

4.5. Perform a structured analysis of the costs and benefits of maintaining a spare for the 125 MVA transformers, considering age and equipment condition and the recent failures of the T1 transformer at Sunnyside Terminal Station and the T5 Transformer at Western Avalon Terminal Station. (Conclusion No. 4.19)

Hydro has completed the analysis for a spare 125 MVA power transformer and prepared a budget proposal and report for consideration in the 2018 capital plan.

4.6. Conduct a structured analysis of expanding the SCADA system to include more and perhaps all distribution substations, in order to reduce customer minutes of interruption, and to reduce SAIDI. (Conclusion No. 4.20)

Hydro has completed the analysis and developed a multi-year capital plan to expand its SCADA system to additional reclosers on the distribution system.

4.7. Apply animal guards at distribution substations when conducting maintenance work in the substations. (Conclusion No. 4.23)

Hydro has analyzed outage data caused by animal contact and also obtained input from other utilities. Animal guards will be considered during Hydro's work planning process where there may be a benefit to customers.

TRO Asset Management

5.1. Formulate a comprehensive and structured plan to bring maintenance backlogs to a more appropriate sustained level. (Conclusions Nos. 5.3, 5.4 and 5.5)

Hydro has reviewed and updated its work order backlog to ensure it reflects the right priority work. A draft standard has been prepared and is being implemented to manage and measure backlog.

5.2. Perform a cost/benefit analysis of providing crews with laptop computers. (Conclusion No. 5.6)

Hydro has reviewed its deployment of laptop computers to employees and the current arrangement is meeting business needs. Future deployment of technology will be considered as business systems evolve.

System Operations

Liberty noted Hydro's ECC was appropriately staffed and equipped and had no specific recommendations in this section. Liberty did reiterate recommendation 4.6 to expand the SCADA system and that recommendation is addressed above.

Outage Management

7.1. Study the costs and benefits of a variety of Outage Management System opportunities in order to provide a basis for assessing potential options. (Conclusion No. 7.1)

Hydro has reviewed outage management systems and consulted with suppliers and other utilities and a business case does not exist at this time to implement an outage management system.

Emergency Management

8.1. Include in the Corporate Emergency Response Plan and in the Severe Weather Preparedness Protocol guidelines for determining how to classify a predicted or actual outage event as minor, major, or catastrophic in terms of numbers of customer interruptions or customer interruption hours, as a minor, major, or catastrophic emergency for determining preparedness requirements. (Conclusion Nos. 8.2 and 8.3)

This item is complete. Hydro has reviewed and revised as appropriate the criteria described in the Corporate Emergency Response Plan (CERP) for determining the level of emergency response required in the context of outage/customer impacts. As well, in advance of severe weather Hydro's System Operations group assesses the weather forecast, the system demand forecast and system equipment status for readiness. Preparedness checklists and response plans are completed by operational areas subject to being affected by the severe weather. For large, significant events System Operations follows this up with a coordinated meeting to review and consolidate the readiness and response plans from the operational areas.

8.2. Develop a Restoration Protocol, in addition to the Severe Weather Preparedness Protocol, to address: (a) assessing storm damage, (b) assigning a Storm Level of activity based on the magnitude of equipment damage and customer outages, (c) providing emergency living quarters and meals for crews, when necessary, (d)

protecting the public from downed lines, and (e) prioritizing restoration of terminal stations, substations, and feeders. (Conclusion No. 8.3

Hydro has prepared a draft storm restoration protocol which will be reviewed in fall 2016 for adoption. Also, as per response to recommendation 8.3 below, Hydro also relies on operating instructions which specifically address system restoration scenarios.

8.3. Include references in the Restoration Protocol to the uses of the various restoration-related Operating Instructions which may apply to Severe Weather related restorations. (Conclusion No. 8.3)

Hydro's System Operations group uses documented operating instructions as the primary means for system operators to operate and manage the Island Interconnected System, including emergency restoration plans in response to events such as severe weather. Examples include operating instructions to address East Coast Restoration, Holyrood Black Start from Hardwoods, Generation Reserves, Avalon Capability and Reserves and Rotating Outages. Hydro has also included these references in the draft storm restoration protocol which will be reviewed in fall 2016 for approval and adoption.

Customer Service and Outage Communication Issues

9.1. Hydro should develop a key accounts management program to support and serve large industrial and commercial customers. (Conclusion No. 9.2)

This recommendation has been completed. In 2015 a key account management framework was developed to support our Key Account Program. A Manager, Key

Accounts was hired to oversee the program and serve as the single point of contact for all services provided by Newfoundland Labrador Hydro. The Manager, Key Accounts is part of the Customer Service Department and reports to the Manager, Customer Service. The Manager, Key Accounts works closely with others in the organization as well as managers and Hydro Executive. The program's focus is to strengthen the relationships between Hydro's key commercial and industrial customers.

9.2. Hydro should conduct customer research to better understand its largest customers. (Conclusion No. 9.3)

This recommendation has been completed. In 2015 Hydro engaged MQO Research, an Atlantic Canada research organization to conduct in-depth interviews with Hydro's key commercial and industrial customers. The interviews focused on a number of areas including billing, energy efficiency, communication, customer service and account management. The interviews were conducted by telephone and in-person and were 30 – 45 minutes in length. Results developed from the survey will feed into the Key Accounts program and will be included in our key account plans for our key commercial and industrial customers.

Governance and Staffing

10.1. Make adjustments that will bring the Hydro board of director structure and operations more in line with the prevailing utility/holding company model. (Conclusion No. 10.1)

All changes to the governance structure and the Hydro Board of Directors are, by legislation, the purview of the Government of Newfoundland and Labrador. In April,

the provincial government announced an interim Nalcor board, comprised of five individuals who will provide leadership and governance to all lines of business. As well, in May, Government announced the implementation and composition of an Independent Appointments Commission, a legislated independent non-partisan commission responsible for providing merit-based recommendations of qualified individuals for appointment to the province's largest Agencies, Boards and Commissions. (http://www.releases.gov.nl.ca/releases/2016/exec/0525n08.aspx). On June 23, 2016, the Independent Appointments Commission welcomed applications for appointments to the Nalcor Board of Directors and the Newfoundland and Labrador Hydro Board of Directors. Hydro awaits the outcome of this application process.

10.2. Restructure the senior-level executive organization to create a consolidating executive within Hydro, and escalate the regulatory affairs function to the level of officer, reporting to the Hydro consolidating executive. (Conclusion No. 10.2)

Complete with 2015 creation of President, Newfoundland and Labrador Hydro, also Vice President Regulatory Affairs and Customer Service, Newfoundland and Labrador Hydro. However, the company is currently working through changes to its organizational structure to support and provide separation, accountability and clarity to Newfoundland and Labrador Hydro within Nalcor Energy. Details will be provided to the Board once this work is complete.

10.3. Submit to the Board a comparison of Project Execution and Technical Services work assignments resulting from the work planning process with home base assignments. (Conclusion No. 10.3)

This has been communicated to the Board as requested. Currently the PETS structure remains unchanged; however, the company is working through changes to its organizational structure to support and provide separation, accountability and clarity to Newfoundland and Labrador Hydro within Nalcor Energy. Details will be provided to the Board once this work is complete.

10.4. Enhance and finalize the draft master enterprise risk document and engage risk management personnel early and with operations personnel in identifying, sizing, and planning for mitigation of operations risks. (Conclusion No. 10.5)

This item has been completed. With respect to the documentation supporting the ERM program, a Policy Statement was approved by the Nalcor Board in fall 2014 to complement the more detailed Framework and Procedures. This Policy Statement was reviewed by the Chief Risk Officer in the fall of 2015 with no changes recommended. The review by all lines of business and functional areas of the detailed Framework and Procedures document was initiated in early 2015 and spanned nearly a year to allow for input from across the organization. This was followed by official sign off from all lines of business and functional areas in the fall of 2015. There was also a Corporate Risk and Insurance plan created for Hydro to articulate how compliance with these updated procedures would be achieved. This is now referenced in Hydro's corporate strategic plan and updated annually. The position of Manager, Operational Risk and Insurance was created and staffed by a Professional Engineer in late 2014 with focus on operational risk. In 2015, training sessions rolling out the updated Framework and Procedures took place in functional areas throughout Hydro, focusing on operational risk, structured around and linked to Hydro's strategic plan and focused on risk identification and mitigation.